CLAIMS:

1. Optical information record medium, comprising at least one information layer, characterized in that the information layer is constituted by a transparent layer wherein nano-elements tubes having a symmetry axis are embedded.

2. Optical information record medium as claimed in claim 1, characterized in that the nano-elements are nanowires.

3. Optical information record medium as claimed in claim 1, characterized in that the nano-elements are nanotubes.

4. Optical information record medium as claimed in 3, characterized in that the nanotubes are carbon nanotubes.

5. Optical information record medium as claimed in 4, characterized in that the nanotubes are single wall nanotubes.

6. Optical information record medium as claimed in claim 3, 4 or 5, characterized in that the material of the information layer is essentially solid at temperatures below 30 °C.

7. Optical information record medium as claimed in 3, 4, 5 or 6, characterized in that the material of the information layer is liquefiable at temperatures below the temperature at which the nanotubes get destroyed.

8. Optical information record medium as claimed in any one of claims 3-7, characterized in that the material of the information layer is selected from the group consisting of glasses with melting or glass temperatures below 800 °C, acrylic thermoplastics and paraffin's.

9. Optical information record medium as claimed in any one of claims 3-8, characterized in that the material of the information layer comprises an oxidizer component located close to the nanotubes.

10. Optical information record medium as claimed in claim 10, characterized in that the oxidizer component is selected from the group consisting of nitrates, oxides, peroxides, sulfoxides, BaO_2 and Ag_2O.

11. Optical information record medium as claimed in any of claims 1-10, wherein the plane of the information layer is divided in information tracks, each comprising a number of successive regions, characterized in that in regions comprising a number of nano-elements the symmetry axes of all nano-elements are aligned in one direction.

12. Optical information record medium as claimed in any one of claims 1-11, having a disc shape, characterized in that nano-elements of radial aligned regions of the information tracks are radial aligned.

13. Optical information record medium as claimed in any one of claims 1-12 and having information encoded in information areas, characterized in that lands are present between neighboring information tracks and in that the information areas of these tracks comprise nano-elements of the same type.

14. Optical information record medium as claimed in any one of claims 1-12 and having information encoded in information areas, characterized in that the information areas of neighboring information tracks comprise different types of nano-elements.

15. Optical information record medium as claimed in any one of claims 1-14 and comprising at least two information layers, characterized in that information areas in information tracks of each information layer comprise nano-elements of a type different from the types of nano-elements present in the information areas in corresponding information tracks of the other information layers.

16. Optical record medium as claimed in claim 14 or 15, characterized in that the nano-elements of different types differ from each other in that they have different orientations of their symmetry axes.

17. Optical record medium as claimed in claim 14 or 15, characterized in that the nano-elements of different types differ from each other in that they have different chemical compositions.

18. Optical record medium as claimed in claim 14 or 15, characterized in that the nano-elements of different types differ from each other in that their dimension perpendicular to the symmetry axis is different.

19. Optical recording device for recording information in an optical information record medium as claimed in claim 1, comprising:

a radiation source unit for supplying a radiation beam;

means for modulating the beam according to the information to be recorded, characterized by means for modifying nanotubes in selected regions of information tracks, which regions are determined by the information to be recorded, such that in said tracks information areas are created.

20. Optical recording device as claimed in claim 19, characterized in that the means for modifying comprises means for destroying nano-elements in the selected regions.

21. Optical recording device as claimed in claim 19, characterized in that the radiation source unit comprises a radiation source and means for changing the polarization of the radiation beam.

22 Optical recording device as claimed in claim 19, or 21, characterized in that the means for modifying comprises means for heating the information layer of the optical information record medium to allow liquefaction of the information layer.

23. Optical recording device as claimed in claim 22, characterized in that the means for heating are constituted by the radiation beam.

24. Optical recording device as claimed in any one of claims 19 and 21-23, characterized in that the means for modifying comprises means for re-orienting nano-elements.

25. Optical information recording device as claimed in claim 22, characterized in that the means for re-orienting nano-elements comprises means for applying an electrical field across an information layer of the information record medium.

26. Optical information recording device as claimed in claim 24, characterized in that the means for re-orienting nano-elements is constituted by the radiation beam, being a linearly polarized beam.

27. Optical reading device for reading information from an optical information record medium as claimed in claim 1, comprising

a radiation source unit for supplying a read radiation beam;

means for focussing the read beam to a read spot in an information layer, and

detector means for converting read beam radiation from said information layer into an electrical signal, characterized in that the radiation source unit supplies a linearly polarized beam and in that the detector means is polarization-sensitive.

28. Optical reading device as claimed in claim 27 for reading information areas, which, in the track direction, have a size smaller than the read spot, characterized in that the detection means comprises comparing means for comparing detector signals obtained at successive moments spaced by a time interval at least equal to the time interval that is needed to move the read spot and the record medium relative to each over a distance equal to said area size.

29. Method of preparing an optical information record medium as claimed in claim 1 for recording information on it, characterized in that the symmetry axis of all nano-elements are aligned in the same direction by successively heating the material of an information layer all over its surface in the presence of an electrical field across the information layer.

30. Method of recording information in an optical information record medium as claimed in claim 1, by means of a radiation beam that is modulated according to the information to be recorded, characterized by modifying nano-elements in selected regions of information tracks, which regions are determined by the information to be recorded, such that in said tracks information areas are created.

31. Method of recording as claimed in claim 30, characterized in that modifying comprises destroying nano-elements in the selected regions.

32. Method of recording as claimed in claim 28, characterized in that modifying comprises reorienting nano-elements in the selected regions.

33. Method of recording as claimed in claim 32, characterized in that re-orienting nano-elements comprises the steps of:

a) heating the selected regions to allow liquefaction of the information layer material, and

b) aligning the symmetry axes of all nanotubes present in each liquefied region in the same direction.

34. Method of recording as claimed in claim 33, characterized in that heating is performed by means of the radiation beam.

35. Method of recording as claimed in claim 33 or 34, characterized in that reorienting of the nano-elements is realized by means of an electrical field across the information layer.

36. Method of recording as claimed in claim 33 or 34, characterized in that reorienting of the nano-elements is realized by means of the radiation beam, being a linearly polarized beam.

37. Method of reading information from an optical information record medium as claimed in claim 1, by means of a read radiation beam which is focused to a read spot in an information layer of the medium and detecting modulated radiation from the information layer, characterized in that use is made of a read beam which is linearly polarized in a

predetermined direction and in that the intensity variation of the radiation from the information layer and having the predetermined polarization direction is detected.

38. Method of reading as claimed in claim 37 for reading an information plane having alternating different types of information tracks, which tracks differs from each other in that they comprise nano-elements of different types, respectively, characterized in that different types of read radiation are used for reading the different types of tracks and in that modulated radiation of different types are detected separately.

39. Method of reading as claimed in claim 37 for reading a record medium having different types of information layers, which layers differ from each other in that they comprise nano-elements of different types, respectively, characterized in that the different types of read radiation are used for reading the different types of information layers and in that modulated radiation of different types are detected separately.

40. Method of reading as claimed in claim 38 or 39, characterized in that the different types of read radiation are used and detected simultaneously.

41. Method of reading as claimed in claim 38, 39 or 40, characterized in that the types of read radiation are different from each other in that they have different linear polarization directions.

42. Method of reading as claimed in claim 38, 39 or 40, characterized in that the types of read radiation differ from each other in that they have different wavelengths.

43. Method of reading as claimed in claim 40, characterized in that circularly polarized read radiation is used.

44. Method of reading as claimed in any of claims 37-43 for reading information areas, which, in the track direction, have a size smaller than the read spot, characterized in that detector signal values, obtained at successive moments spaced by a time interval at least equal to the time interval that is needed to move the read spot and the record medium relative to each over a distance equal to said area size, are compared with each other.